

Canon Ranch Eclipse Windmill
Sheffield Vicinity
Pecos County
Texas

HAER No. TX-7

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TEX,
186-SHEFF,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
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HISTORIC AMERICAN ENGINEERING RECORD

CANON RANCH ECLIPSE WINDMILL

HAER No. TX-7

Location: Canon Ranch, approximately 15 miles northwest
of Sheffield, Pecos County, Texas

Date of Construction: c. 1907

Original Owner: John W. Canon

Present Owners: G. M. Canon Family
850 Gaylord
Denver, Colorado 80206

Richard H. Canon Family
303 Cadiz Road
Santa Fe, New Mexico 87501

Present Occupant: Canon Ranch Manager
P.O. Box 322
Sheffield, Texas 79781

Present Use: Working Windmill

Significance: The Canon Ranch "Eclipse" Windmill, "Texas
Pattern" type, is the largest functional
turbine-wheel style American windmill known
to be in existence today, and the only known
working model of its size still in its
original location. It has been listed on the
National Register of Historic Places since
1977.

Prepared by: James E. White, A.I.A., August 1981

Transmitted by: Jean P. Yearby, HAER, 1984

PART I: HISTORICAL INFORMATION

The region west of the Pecos River in Texas was settled comparatively late because of its semi-arid land generally lacked springs and streams. Coping with mounted Indian raids as late as the 1880s no doubt contributed to the hesitancy of prospective settlers. But Indian control policies by the U. S. and Mexico, the spread of a new technology--the American windmill--combined with a cattle boom and continuing railroad development finally brought an end to this last frontier. (See Webb, 1931, for a definitive treatment of these events.)

John W. Canon was one of the early settlers in the region, assembling his lands in 1895 for raising sheep and cattle. The "Eclipse" windmill of this project served not only as his headquarters, houses, and garden for his family and employees, but also livestock watering in the corral area. Windmill water was hauled by tanks mounted on wagons to the sheep herders during lambing in the days before fencing. (Wolfe, 1965: 6-7)

In addition to the subject "Eclipse" windmill, John Canon also erected similar mills, one four miles west and another four miles due north. These in trident fashion provided much of the water for the immediate ranch, which at that time encompassed about 30,000 acres.

The date of c. 1907 for the erection of the headquarters' "Eclipse" corrects earlier oral history and printed articles. It was established by studying photographs that there had been an earlier windmill on the site which did not have the characteristics of a larger size "Texas Pattern" mill.

After a settlement period lasting until just after World War I, a son of John Canon, Charles Canon, operated the ranch and instituted changes typical of this new generation of ranchers. Cross fencing was the key element which brought an end to the sheep herder system. In order to serve these pasture areas, eventually thirteen mills and their corresponding tanks and troughs were built for this particular ranch, now consisting of 16,000 acres. The headquarters "Eclipse" then pumped to a formidable water system erected on a hill to the mill's north, so gravity flow would furnish water to more outlying troughs in the nearby pasture areas and the larger houses and yards.

The galvanized steel windmill, geared, self-oiling and on a steel tower, was coming into its own, a welcome addition by people who had to cope with the constant maintenance and danger of the old wooden, direct stroke mills that nonetheless permitted settlement in the first place. In this region, most of the wooden mills had been replaced by the end of the 1930's and the Canon Ranch headquarters "Eclipse" began to be recognized as a landmark by people in the area. It was saved because, for many years after construction of the hill water system, it was the only mill available that could pump the large quantities of water up such an incline (Charles Canon, personal communication to G. M. Canon).

In 1956 the coming of rural electrification to the ranch brought the next stage. The "Eclipse" was disconnected and replaced by electric pumps at the well. Efforts to preserve the mill continued and, more recently, sophisticated and detailed research in the restoration of 1981 has preserved an even more authentic example

of nineteenth century water supply engineering design. G. M. Canon's Field Journal covers the details of this restoration, the events and recent history that led to this latest restoration and drawing project (Canon: 1981). When the Canon Ranch "Eclipse" windmill first began to attract the notice of a larger audience, several newspaper accounts with photographs were published over the years, with the mill as the chief feature or simply mentioned. These accounts are sometimes essentially correct, but many others have major errors in historical representation on reconstruction, facts, dates, and even location (See bibliography).

Continuing electrical costs are setting up the next planned phase of the Canon Ranch "Eclipse". Technology now exists that will make it possible to install a submersible pump in the well beneath the windmill's pumping cylinder. This will permit the mill to return to more operating time and yet permit easier use of the electric pump during times of high water needs.

C. History of Eclipse Windmill Manufacturers

Reverend Leonard H. Wheeler invented the "Eclipse" windmill in 1867. The firm of L. H. Wheeler and Son of Beloit, Wisconsin manufactured the mills from 1867 to 1873. The original design employed a wheel consisting of four wooden blades, a hinged rudder vane, and a smaller side vane fixed parallel to the wheel.

The fixed side vane and hinged rudder van initiated a major departure from the regulating problem solutions of other manufacturers who mostly used the sectional wheel concept. Dr. T. Lindsay Baker, Curator of Science and Technology at The Panhandle-Plains Historical Museum of Canyon, Texas describes these differing

approaches to the developing turbine-type windmills.

The "Halladay" and "Eclipse" windmills represent the two basic types of American windmills manufactured through the second half of the nineteenth and early twentieth centuries, the "sectional-wheel" and the "solid-wheel" mills. All the early windmills were made from wood, with some iron and steel parts. The sectional mills were so designed that with increasing wind velocity the "sections" of their wheels would fold inward--something like closing of an umbrella. The "Eclipse" windmills represent the other basic type of mill. Their wind wheels were rigid or "solid". They did not fold in, but remained in a permanent position. Solid-wheel mills were governed generally by the use of a side vane, a vane parallel with the wheel that pushed the wheel out of the wind when velocities grew too great. (Baker, 1981: 40)

Problems with the "sectional-wheel" windmills included more frequent breakdowns because of the comparatively high wear and strain on the moving parts in the wheel contrasting with the "solid-wheel" types. Snow accumulations on such hinged mills caused problems as well as high winds, whereas the "solid-wheel" types simply turned to the side of high winds and returned to operating position into the wind when velocity decreased that formerly overpowered its governing weights.

The basic concept of the fixed side vane and hinged rudder was used by the L. H. Wheeler and Son Co. and all its successor companies throughout the years of development, including utilization on the large "Railroad Pattern" and "Texas Pattern" mills of which the Canon Eclipse is representative.

In 1873 the Wheelers' company had grown to the point of requiring expansion of its plants through more capital needs. C. B. Salmon and S. T. Merrill bought the patent rights to the "Eclipse" from the Wheelers and founded the Eclipse Wind Mill Company of Beloit on May 13, 1873. The Wheelers retained a portion of stock in this company.

The new company operated until February 11, 1880, when it was reorganized into the Eclipse Wind Engine Company of Beloit. The Wheelers still retained over half the stock in this reorganization. A fifth of the stock was purchased by Charles H. Morse, a partner in the firm of Fairbanks, Morse and Company of Chicago. That company then became the distributor of the Eclipse windmills in the area where they had branch houses. This Chicago-based firm took control of the "Eclipse" firm in 1890, but the Beloit company continued to distribute for a number of years and had the only manufacturing facility since the days of the Wheeler's first efforts.

The mainstay of the company's manufacture was the regular pattern "Eclipse" windmill produced by the thousands and distributed to all regions of the United States as well as abroad. It was the classic example of "solid-wheel" wooden windmills. These mills utilized a governor weight cast in the shape of a new moon. This was a direct stroke mill, the pump rod making one stroke per revolution of the wheel, preceding the later invention of geared windmills where several reciprocal strokes were made for each turn of the wheel.

Regular pattern "Eclipse" mills appeared as early as 1870. Except for the thirteen-foot size discontinued in the 1880's, the remaining sizes of eight and one-half-, ten-, twelve-, thirteen-, and fourteen-foot sizes were produced until the 1920's. In 1908 through 1914 a sixteen-foot "regular pattern" mill was added. (Baker, in press)

The "Railroad Eclipse" is a larger heavy duty version of the Eclipse windmill. The term "railroad" is generic for several companies

had large models of their own make designed for use in supplying water principally for railway steam engines but also for livestock watering, domestic and community water supply, and industrial applications. The "Railroad Pattern Eclipse", as opposed to the Canon Ranch's "Texas Pattern Eclipse" version of the "Railroad Eclipse", appeared first and as early as the 1870's. This model was available in sizes up to twenty-five feet in diameter. A thirty-five foot model was added for use as a power mill in the mid 1880's and became available for pumping water in 1890. The "Texas Pattern" type appeared between 1906 and 1914. The principal difference is the main casting employing a spacer casting bolted over the wheel shaft's seating used by the "Railroad Pattern". The raised spacer casting has a babbitted seat on its top for receiving the wheel's shaft. This allows a larger diameter crank plate to be utilized, thereby increasing the stroke length. (Baker, in press)

Instead of a cast iron new-moon weight mounted on a lever extending from the main casting, as on the "Regular Pattern" mills, these larger mills utilized several iron balls fastened one to the other that hang from the end of a cut-off pole about two-thirds of the way down the tower. The sixteen- and eighteen-foot mills have interchangeable castings, as do the twenty- and twenty-two and one-half-foot models. Some castings are interchangeable between the twenty-five- and thirty-foot mills and next two smaller sizes.

The vane design of the "Railroad Pattern" and "Texas Pattern" types were of several styles. The ironwork, however, remained essentially the same from the 1870's to World War I.

A special "telescopic" wooden tower was erected for these large type mills. The company did not provide these but did offer specifications and erection instructions.

A detailed explanation of the tower, the side vane and hinged rudder principal leading to the solid wheel, and other operating features are described on the Canon Ranch Eclipse in Part II under ARCHITECTURAL INFORMATION.

Wood on all "Eclipse" mills used cypress for the blades of the Wheel and the Vanes' slats; cypress or ash for the Cross Bars; oak for the Arms and Braces; fir for the Rudder Vane Bar and Circle Board. All wood parts were a light olive green, with the vanes and blade tips trimmed in blood red or maroon. The castings and vane lettering were black. Wood parts were vat-dipped and were generally below the painting quality exhibited by many other windmill companies whose well-painted, trimmed and often gothic-lettered models shared the American landscape with "Eclipse".

By the end of World War I, only twenty-foot mills remained on the market, but these were soon phased out as well (Baker, in press). The advent of geared, self-oiling, and metal windmills signaled a trend that saw the almost complete extinction in present days of the direct stroke, wooden windmills.

The prestige of the "Eclipse" role in the early development of the 'American turbine-type windmills is reflected in the company's trade literature:

"Victorious over all others at three World's Fairs.

Recipient of over 100 Premiums and Diplomas.

Five Silver and two Bronze Medals.

The only Wind Mill ever awarded a Gold Medal."

(Eclipse Windmill Co. 1879: Back Cover)

In the 1876 Centennial at Philadelphia, a large storm severely damaged all competing mills except those in the "Eclipse" exhibit. It was purchased by the Prussian government and several foreign commissioners ordered mills from Beloit for introduction to their countries (Beloit Historical Society, undated: 1).

Perusal of the early trade literature of the "Eclipse" companies brings forth the testimonials of numerous purchasing agents of the largest railroad companies, managers of estates and large farms, and the relating of orders received by the U. S. government for forts, by civil water works, etc.

In addition to its wooden windmill line, the company manufactured steel windmills, various pumps and valves, wood water towers, clutches, pulleys and hoists, and gas engines. By the end of the century, the departments included a Gas Engine Department of 117 men, the Machine Shop (50), the Wood Shop (4), Blacksmith Shop (15), Paint Shop (4), Tank and Tower Shop (25), Metal Pattern Shop (4), Galvanizing Department (11), Wood Pattern Shop (9), Shipping Department (15), Stores (2), Yard Department (10), Office (7), and Foundry (58). (Beloit Historical Society, undated: 2)

The patent rights to the "Eclipse" expired in 1901, and at that time, there were many companies which began producing mills that were almost identical to the "Eclipse". The only changes were casting numbers, paint color, and design of the governor weights. Some of the models and companies were: "U. S. Model E," U.S. Wind Engine and Pump Company, Batavia, Illinois; "Superior Eclipse", Superior Pump and Wind Mill Company, Chicago, Illinois; the "Standard", F. W. Axtell Manufacturing Company, Fort Worth, Texas; the "Leader", Flint and Walling Manufacturing Company,

Kendallville, Indiana; the "Dempster No. 9", Dempster Mill Manufacturing Company, Beatrice, Nebraska (Baker, in press).

PART II: ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character:

The tower is constructed of 8" x 8" timbers of unknown wood. The bracing of the tower is composed of 2" x 8" members, as is the working platform.

The Canon Ranch "Texas Pattern" "Eclipse" windmill represents the epitome of the large solid-wheel wooden windmill. The parts, in addition to the tower, are the solid wood Wheel, a wood hinged Rudder Vane, (hinged vane), a Side Vane fixed parallel to the Wheel, and the necessary parts of steel and iron. The hinged Rudder Vane and Side Vane recorded are not original to the windmill, but are copies of those original vanes.

The original species of woods used by the factory described in Part IC differ only in the Canon's rehabilitated mill using fir in the Cross Braces and red wood in the Blades, these being in the Wheel sections. Such variation reflects the general practice of many years in the region before World War II when these woods were more readily available to windmillers and users than parts from any factory for these size mills.

The wooden parts and lettering are painted to factory specifications as mentioned in Part IC. The factory painted Blade tips into a half-moon profile at the proximal end of the trim which the Canon version emulates rather than another version of the factory which dipped the end of spare part Blades thus forming

a straight-across trim. Some new mills also bore the straight pattern trim on blade tips. The tower is painted white.

2. Condition of fabric:

The condition of the tower is good, most all of it being original. All metal parts are in good condition and operational. Almost without exception, these metal parts are original.

The wooden wheel sections and vane assemblies are of new wood. The rehabilitation had older wood of such working parts finally replaced since practical considerations overruled the owners' desire to use some of these parts. Four generations of family photographs show at least three Side Vane styles, four Rudder (Hinged) Vane styles, and differing shades of paint on the Wheel sections, confirming widely held experience of early owners and windmillers who were constantly having to replace these short-lived items.

B. Description of Structure:

1. Overall dimensions:

The tower at the base is approximately eleven feet square; the working platform, approximately ten feet by ten feet; and the oiling platform approximately three feet by three feet, including handholds. The windmill is approximately fifty-three and one-half feet from grade to the top of the wheel. The wheel itself is twenty-two and one-half feet in diameter. The working platform is approximately thirty feet above grade.

2. Structure system:

The tower columns are set in concrete along with short posts affixed to the columns reinforced by steel angles placed on the edges of the posts. The angles, posts and tower columns are pierced by long bolts to better secure the mill.

The Canon "Eclipse" has the "telescopic" or "double" tower mentioned in section Part IC. A large wheel mounted on a conventional tower that has an inverted "V" shape would come very close to hitting the tower at the wheel's perimeter, especially when a more spread-footed or wider based tower was required to counteract the forces of the large wheels. Therefore, an inner tower was designed at the top that fit between the four main vertical tower columns and extended above it, providing a more narrow protrusion toward the wheel's perimeter and a mounting for the wheel's pivot casting. It is further anchored principally by resting on horizontal beams that go across the main tower about two-thirds the way up. These features provide a tower not only of the necessary large wheel clearance, but a foundation of lasting rigidity and strength.

Columns of the main tower are spanned by braces on three sides in "X" fashion, three such "X" configurations ascending the tower on those sides. On the west side, a parallel "slot" has been constructed to allow more room to manipulate long sucker rods and pipe as they are removed from the well for maintenance.

In addition to the main work platform is an oil platform consisting of separate rounded horizontal pieces with centered hand holes.

The ladder is constructed of mortised 2" x 4" side rails with 1" x 4" rungs leading to the working platform. The rungs of the inner tower are 2" x 8" parallel boards fastened directly to the corner posts of the tower.

C. Operation of the Working Parts:

Eight Wheel partitions are each divided into an outside and inside section. Each section has two parallel straight Cross Braces that are slotted and angled to receive thin wooden beveled Blades

that narrow in this nailed assembly toward the center of the wheel and widen toward the perimeter of the wheel, pie-fashion. These sections are clamped by Wheel Clip castings and bolt onto oak Arms that radiate outward from a casting pierced by the Main Shaft which terminates in a Brace Plate fitted to receive eight oaken Braces on the windward side. These Braces are bolted near the perimeter of corresponding Arms to restrain the wind from bending the Wheel backward. The tensioning of the Braces, in conjunction with a tapering design of the Arm's distal ends, help establish a slight concavity to the wheel on its windward side. The center of the Wheel is not slatted in order to facilitate wind in aligning the large Rudder Vane parallel to the wind's direction in operation which in turn causes the Wheel to be perpendicular to the wind.

The Wheel is centered around the cold rolled steel Main Shaft. Rotary motion is imparted by wind passing over the angled Blades. The shaft rests in a babbited receiving slot on the Pivot Casting's "Texas Pattern" spacer called a Lower Half Main Box. The shaft is enclosed on the top by a bearing cap called an Upper Half Main Box. Keyed to the Main Shaft's end, opposite to the nose, is a round Face Plate that is a crank. A Wrist Pin through this plate attaches a vertical Pitman Rod that transmits up and down motion created by the rotary motion of the plate. The Pitman Rod is guided by grooves within the Pivot Casting that act on the Pitman Babbitted Cross Head which in turn imparts up and down motion to the Piston Guide, screwed to its bottom side. This rod is clamped to the wooden Pump Rod that extends within six feet of the ground. At that lower end, the pump rod would be screwed into the well's sucker rods.

The features which allow the mill to regulate itself according to "Wheeler's Patent" are as follows:

The windmill's Pivot Casting extends vertically downward through a Tower Collar bolted to the top of the inner tower's four vertical columns. Within the Tower Collar's cavity, the Pivot Casting pivots with wind changes but the weight of the entire Wheel, the two vane assemblies and the Pivot Casting itself are all carried by a Pivot Step laid horizontally across the inner tower where the distal, narrowed and beveled end of the Pivot Casting rides atop a case hardened washer, the Step Ring, inserted into the recess of the Pivot Step. The rear of the Pivot Casting contains a cast sleeve to vertically receive the King Bolt of the Rudder Vane assembly consisting of a Circle Table to which is bolted the Rudder Vane Bar which in turn carries the slatted Rudder Vane with a swallow tail profile. The entire assembly is braced and trussed and hinges on the King Pin. Around the half-moon portion of the Circle Table are grooves that hold chains that in turn attach to linkages allowing the mill to cut on and off automatically or to be cut off manually at the bottom of the tower. A slatted, Side Vane with a modified ogee-shaped profile is attached to a horizontal pipe support inserted into a casting bolted to the side of the Pivot Casting thereby fixing its position parallel to the Wheel at all times. It is trussed on the downwind and leeward sides.

In operation the regulating mechanism was described by the manufacturer in this way:

The pressure of the wind on the (Side) Vane, as it increases, tends to carry the wheel around out of the wind to a position parallel with the tail (Rudder Vane). This tendency is counteracted by the weight of balls No. 49 hanging on the shut-off pole G, which brings the mill back again to its

normal position as the wind dies away, thus enabling the mill to take care of itself with a surety in all kinds of weather.

(Fairbanks, Morse & Co., 1910: 6)

The manual cut-off mechanism called the Out Gear Reel is distinctive in the "Railroad Eclipses" types and is present on the Canon mill. In appearance it resembles a ship's capstan and was a major departure from almost all other windmill manufacturers, who mostly used a simple hinged lever to manually cut off the wheel. The force of wind on such large mills coupled with the longer length of travel for its long rudder vane to be brought parallel to the wheel was solved by this Out Gear Reel attached vertically to the side of the tower near the ground. By turning the arms a chain was wound onto the reel that was stopped from unwinding by a Pawl acting on corresponding teeth in a ratchet fashion. The chain in turn is connected to a heavy gauge wire ascending the inside tower where it returns over a Reel Sheave, descending to its attachment to the bottom of the Cut-Off Pole. When the chain and attached wire is reeled, it causes the Cut-Off Pole, overruling its attached Regulating Ball Weights, to push a slide mechanism composed of rods, guides, and supports that apply tension to the Circle Board Chains and brings the Rudder Vane in toward the Wheel. In such a position, as in the automatic regulation, the Rudder Vane guides the wheel out of the wind which ceases to turn the Wheel. When the Pawl is released and the Out Gear Reel unwound, the Regulating Ball Weights act as in the automatic regulating system which turns the Rudder Vane to its original working position perpendicular to the Wheel.

D. Site:

1. General setting and orientation:

The windmill is located at the western edge of the ranch headquarters complex. Upon entering the gate to the complex, the owner's house is to the right. The road leads straight ahead to the ranch manager's house, and turns to the left toward a helper's house and continues west to the nearby windmill, barns, and corrals.

PART III. SOURCES OF INFORMATION

A. Early Views:

Photographs from Canon Family members:

Catalog C-4-B (CCC)-30-W-1; C-4-C(CCC)-31-W-2; C-4-D(LRC)-W-3;
C-4-E(LRC)-W-4; C-4-F(LRC)-W-5; C-4-G(LRC)-W-6; C-4-H(LRC)-W-7;
C-4-J(LRC)-W-8; C-4-K(LRC)-W-9; C-4-L(LRC)-W-10; C-4-M(LRC)-W-11;
C-4-N(LRC)-W-12; C-4-O(LRC)-W-13; C-4-P(ALRC)-W-14; C-4-A(GCB)-
11-W-15; C-4-Q(LRC)-W-16; C-4-R(LRC)-W-17; C-4-S(LRC)-W-18;
C-4-K(GCB)-5.

(Cataloged copies in collection of G. M. Canon).

B. Interviews:

George M. Canon of Denver, Colorado, 1981.

Dr. T. Lindsay Baker, Canyon, Texas, 1981.

C. Bibliography:

1. Primary and Unpublished Sources:

Beloit Historical Society. (Untitled) regarding history of the Eclipse Companies (undated). Copy in collection of G. M. Canon.

Canon, George M. Field journal, 1981. Collection of G. M. Canon.

Reynolds, Blanche Canon. Taped reminiscences of Canon Ranch Life, 1974 (copy in collection of G. M. Canon.)

Wolfe, Billie. Rancher regarding Eclipse windmill. Transcript from tape recording by Charles C. Canon, San Angelo, Texas, 1965. (Copy in collection of G. M. Canon.)

2. Secondary and Published Sources:

Baker, T. Lindsay. "Turbine-Type Windmills of the Great Plains and Midwest." Agricultural History, L3, No. 1 (January 1980), pp. 38-51.

. A Field Guide to American Windmills.
Norman, OK: University of Oklahoma Press, in press.

Eclipse Windmill Co. "Descriptive Catalog," 12th ed. Chicago, IL: H. C. Tiffany & Co., 1879. (Library of Congress)

Fairbanks, Morse & Co., Inc. "Instruction No. 2056 Eclipse Windmill 'Railroad' and 'Texas Pattern,'" 1908. (private collection).

Fairbanks, Morse & Co., Inc. "Instruction No. 2056 Eclipse Windmill 'Railroad' and 'Texas Pattern,'" 2nd ed., July 1910.

Fairbanks, Morse & Co., Inc. "Instruction No. 2056 Eclipse Windmill 'Railroad' and 'Texas Pattern,'" 1914, (Fairbanks Morse Engine Division, Colt Industries, Beloit Wisconsin).

Web, Walter, Prescott. - The Great Plains. Ginn & Co., 1931.

Newspaper Articles on or mention of Canon Ranch "Eclipse"

Anonymous

"Library Shows Photographs of Noted Windmill Collections," The University Daily, Lubbock, Texas, January 11, 1967, p. 2.

"Old Eclipse Mill." San Angelo Standard Times, May 12, 1963.

"On Stewart Ranch, Ancient Windmill Preserved." Devils River News, Sonora, Texas, 2 July, 1980, pp. 1,8.

Burton, Gerry. "Passing Era Lives Again in Pictures." Lubbock Avalanche-Journal, July 18, 1968.

Canon, George M. "Ancient Mill on Canon Ranch Turns Eagerly to Every Wind," West Texas Livestock Weekly. San Angelo, Texas. November 15, 1973, pp. 10-11.

Tolbert, Frank X. "Story of a Great Windmill Fixer." Dallas Morning News, April 3, 1967, p. 10.

Woodward, Mrs. Burch. "Windmills--Are They Really 'Desert Air Conditioning'?" The Fort Stockton Pioneer. Fort Stockton, Texas. October 13, 1973, pp. 1 and 7.

PROJECT INFORMATION:

Prepared by : James E. White, AIA
Project Supervisor

August, 1981

The documentation of the Canon Ranch Eclipse Windmill, in the vicinity of Sheffield, Pecos County, Texas was undertaken by White Associates, AIA, Architects, Lubbock, Texas, in cooperation with Texas Archaeological Foundation, Inc., George M. Canon, and the Historic American Buildings Survey (HABS) of the National Park Service's National Architectural Engineering Record, Southwest Regional Office. The project was completed in the summer of 1981 in the HABS Field Office of White Associates, by James E. White, AIA, Project Supervisor (Associate Professor of Architecture, Texas Tech University); Tony Apel (Texas Tech University), and Scott Sanders (Texas Tech University).

APPENDIX A

Parts List References to Drawings

Repair Parts for "Railroad" and "Texas" Pattern Eclipse Windmill.

Taken from Fairbanks, Morse, and Company, October, 1908.

Part Nos. are shown in parentheses on the measured drawings for the
22 1/2 foot windmill.

<u>Part No.</u>	<u>Description</u>
E-1	Tower Collar for Wood
E-2	Pivot Step for Wood
E-3	Guide Rods
E-4	Lower Ring
E-5	Center Rings
E-6	Upper Rings
E-7	Long Chain
E-9LA	Pivot Casting (Long Stroke)
E-10L	Lower Half Main Box (Long Stroke)
E-11A	Upper Half Main Box (Long Stroke)
E-12	Brace Plate
E-13A	Spider
E-14LI	Face Plate (Long Stroke)
E-15A	Main Shaft
E-16	Sheave Stand
E-17	King Bolts
E-18	Tail or Fork Brace
E-19	Nose Brace
E-21	Tail Brace Truss Rods
E-22L	Side Vane Pedestal (Long Stroke)
E-23	Side Vane Bar
E-24	Side Vane Front Brace
E-25	Side Vane Top Brace
E-26	Side Vane Back Brace
E-27	Side Vane Rod Clip
B-9	Side Vane Cross Bar Clip
B-9-2	Side Vane Bar Clip
E-29 (E29A)	Outside Front Wheel Clip
E-30 (E30A)	Inside Front Wheel Clip
E-31 (E31A)	Outside Back Wheel Clip

Repair Parts (cont.)

<u>Part No.</u>	<u>Description</u>
E-32 (E32A)	Inside Back Wheel Clip
D-31PLI	Wrist Pin (Long Stroke)
E-33A	Pitman Wood Box Cap Shell (Modified in field)
E-34A	Pitman Wood Box Shell (Modified in field)
E-66A	Pitman Wood Box (Long Stroke)
E-35B	Pitman
E126	Pitman Rod Bolt
E-65A	Pitman Lower Bushing (Long Stroke)
E-79	Cross Head (Long Stroke)
E-38L	Piston Rod (Long Stroke)
E-39	Swivel Box
E-40	Swivel Box Cap
E-41	Pull Out Rods
E-42	Small Sheave
E-43	Large Sheave
E-44	Out Gear Cross Head
E-45	Out Gear Reel
E-46	Reel Chains
E-48	Reel Sheave and Stand
E-48-I	
E-49	Regulating Balls
E-53	Out Gear Pawl
E-54	Reel Stud
E-55	U-Bolt for Side Vane Rod Clips
E-56A	Stud for Large Sheave
E-57	Fork Brace Stud
F-5B (F5BA)	Clips for Wheels (Round Holes)
F-59 (F59A)	Clips for Wheels (Square Holes)
E-60	Pawl and Latch Support
E-63	Counterpoise Weight
E-64	Cross Braces for Vane, Short
E-72	Circle Brace
E-73	Hook for Circle Board
E-74	Circle Board Eye Strap

Repair Parts (cont.)

	<u>Part No.</u>	<u>Description</u>
	E-75	Piston Collar
	E-76	Collar Clip
	E-80	Cross Head Pin
	E-90	Take-Up Hook
	D-92P	Ball Chain
	D-95P	Joint Bolts
	D-99P	Step Ring
	E-110	Nipple for Vane Brace
	E-117	Brace for Sheave Stud
	E-118	Washer for Vane Bearing
	E-123	Spider Key
	E-124	Face Plate Key
	E-125	Brace Plate Key
	E-127	Chain Coupling
	E-109	Vane Bar
(A)	E-106X	Vane
	E-107	Side Vane
(B)	E-108	Circle Board
(F)	F-114	Pump Pole
(G)	F-115	Out Gear Pole
(K)	E-112	Reel Arms
	E-103X	Wheel Sections, Outer (8)
	E-103AX	Wheel Sections, Inner (8)
	E-104X	Wheel Arms (8)
	E-105X	Wheel Arm Braces (8)
	F-132	Pump Pole Splice Bands
	F-131	Outgear Pole Splice Bands
	E-311	Circle Board Stop (Short)
	E-312	Circle Board Stop (Long)
	E-91	Circle Board Washer

APPENDIX B

Bolt, Screw, Nail and Chain Sizes

BOLT, SCREW, NAIL, AND CHAIN SIZES

Positions and sizes by inference or from artifacts, except where:

- * Confirmed by Parts List B.F. 144 500 dated 10/17/06.
- ** Departure from Parts List for additional length due to later factory style of some reinforced wheel clips, or due to more thread needs for double-nutting on Canon mill rather than following Instructions 2056 (10-80) where bending bolt end over was recommended for preventing loosening of nuts.

- - - - -

WHEEL ASSEMBLY

1. WHEEL CLIPS

Representative ARM of eight, from outer to inner positions backed by washer on nut side.

a) W.C. E29A and E31 A assembled:

** One 5/16" x 3 1/2" carriage bolt through ARM, inner hole.

* One 5/16" x 3 1/2" (** or 4" length) carriage bolt through ARM, outer hole.

** Two 5/16" x 6" carriage bolts on castings' flanks.

b) W.C. F29A and F59 (or 59) assembled:

* Three 5/16" x 5 1/2" carriage bolts (Except F58A and 58 are for round holes requiring square headed bolts).

c) Next position, bolts identical to (b).

d) W.C. E32A and E30A (Or 30E) assembled:

* One 5/16" x 5 1/2" carriage bolt

2. GIRT or WHEEL ARM STUD, between BRACE AND ARM, each of eight:

One 3/8" x 18 1/4" square headed bolt.

3. COUNTERPOISE WEIGHTS, two assembled opposing (Canon Mill):
Two 1/2" x 6" carriage bolts.
Factory: Single or in tandem, each weight:
* Two 3/8" x 3 1/2" bolts.
4. SPIDER, for one flange of eight, each positioning an ARM.
Two 1/2" x 4 1/2" carriage bolts.
5. BRACE, for one of eight, all carriage bolts:
One 5/16" x 3 1/2" and one 5/16" x 4 1/2", outer edges.
Two 3/8" x 2 1/2" for BRACE PLATE position.
6. BLADES OR SLATS, from outer to inner WHEEL SLAT SUPPORTS of
four in typical wheel section, one nail into each SLAT and
SUPPORT:
12d casing; 8d casing; 8d casing; 6d finish.

RUDDER (HINGED) VANE ASSEMBLY

Orientation is viewer looking from WHEEL center to RUDDER VANE in operation. Depth orientation is from CIRCLE BOARD edge toward RUDDER VANE's distal end.

1. CIRCLE BOARD.

CIRCLE BOARD STOPS, top entry through washers:

Eight 5/16" x 3" carriage bolts.

NOSE BRACE:

One 3/4" head x 3" lag bolt, top hole.

One 1/2" head x 4" lag bolt, bottom hole.

CIRCLE BOARD EYE STRAP and CIRCLE BOARD HOOK STRAP:

Two #14 screws securing each of the STRAPS.

CIRCLE BOARD WASHER:

Three #14 screws.

2. RUDDER (HINGED) VANE BAR AND RUBBER (HINGED) VANE.

"VANE BAR BRACE" and through RUDDER VANE BAR, left entry with left and right washers:

Holes 1,2,3, and 4:

3/8" x 10" carriage bolts.

Hole 5:

1/2" x 10 1/2" carriage bolt securing CIRCLE BRACE left and welded truss of right CIRCLE BOARD STOP through "OAK BRACES" and RUDDER VANE BAR. Left entry with right washer.

Carriage bolts securing vertical girts of RUDDER VANE, to RUDDER VANE BAR, left entry with left and right washers:

Hole 6, 7:

3/8" x 6".

Hole 8:

3/8" x 5".

Hole 9, 10:

* 3/8" x 5 1/2" and * 5/8" x 6 1/2" (Square Bolts), TAIL BRACE TRUSS RODS and FORK BRACE to RUDDER VANE sheet, left entry, left and right washers.

Hole 11, 12:

3/8" x 4 1/2".

Hole 13:

3/8" x 7 3/4", that also secures center hole of CROSS BRACES of VANE, and wood NIPPLE FOR VANE BRACE.

Hole 14:

3/8" x 7 3/4".

SIDE VANE ASSEMBLY

SIDE VANE PEDESTAL, to PIVOT CASTING:

Two 5/8" x 4" hex headed bolts.

SIDE VANE CROSS BAR:

One 7/16" "U" bolt for CLIPS.

Two 5/16" x 1 3/4" square bolts, distal end on Canon
Mill, not factory.

MISCELLANEOUS

1. OUT GEAR CROSS HEAD, in attachment to OUT GEAR POLE:

Two 3/8" x 3", square headed bolts, and washers.

2. OUT GEAR POLE:

One 3/8" x 3" eye bolt for cut-off chain.

One 3/8" x 3" eye bolt for REGULATING BALL WEIGHTS.

3. REEL SHEAVE:

* Two 3/8" x 3 1/2" lag screws.

4. PAWL:

One 3/8" x 10" square bolt, Canon Mill arrangement.

* One 3/8" x 4 3/4", for factory arrangement.

5. WOOD REEL ARMS

Six 5/16" x 2 1/2" carriage bolts.

6. SWIVEL BOX and CAP:

Two 3/8" x 2 3/8" square bolts.

7. SWIVEL BOX securing OUT GEAR or PUMP POLE:

Three 3/8" x 5" carriage bolts.

8. OUTGEAR (or PUMP POLE) SPLICE BANDS for attachment to surface
pump rods:

Four 3/8" x 4 1/2" square bolts.

9. UPPER HALF MAIN BOX, to LOWER HALF MAIN BOX:

Eight 5/8" x 1 3/4", square bolts.

10. LOWER HALF MAIN BOX, to PIVOT CASTING:

Eight $5/8$ " x 2", square bolts.

11. TOWER COLLAR:

* Four $1/2$ " x 6", joint bolts.

12. PIVOT STEP:

* Two $1/2$ " x $5\ 1/2$ " square bolts with top washers.

13. LONG and SHORT CHAINS, from pierced lug on E5 CENTER RING
to CIRCLE BOARD STRAPS:

Link size: $1/4$ " thick, $1\ 9/16$ " x $1\ 1/16$ "

SHORT CHAIN,

LONG CHAIN,

APPENDIX C

Paint Colors

PAINT SCHEDULE

ECLIPSE GREEN

Sherwin Williams Formula:

SWP Base B (oil base)

Veldt Grass

3 oz. Gold

4/32 Maroon

8/32 Black

RED TRIM

Sherwin Williams Standard Color Oil Base Paint:

TARTER RED . .

BLACK METAL PARTS

Outside Implement Black (gloss)

APPENDIX D

Fairbanks Morse Instructions No. 2056

1908

1M October, 1908

INSTRUCTIONS No. 2056

(Used in Connection with BF46)

ECLIPSE WINDMILL

"Railroad" and "Texas" Pattern

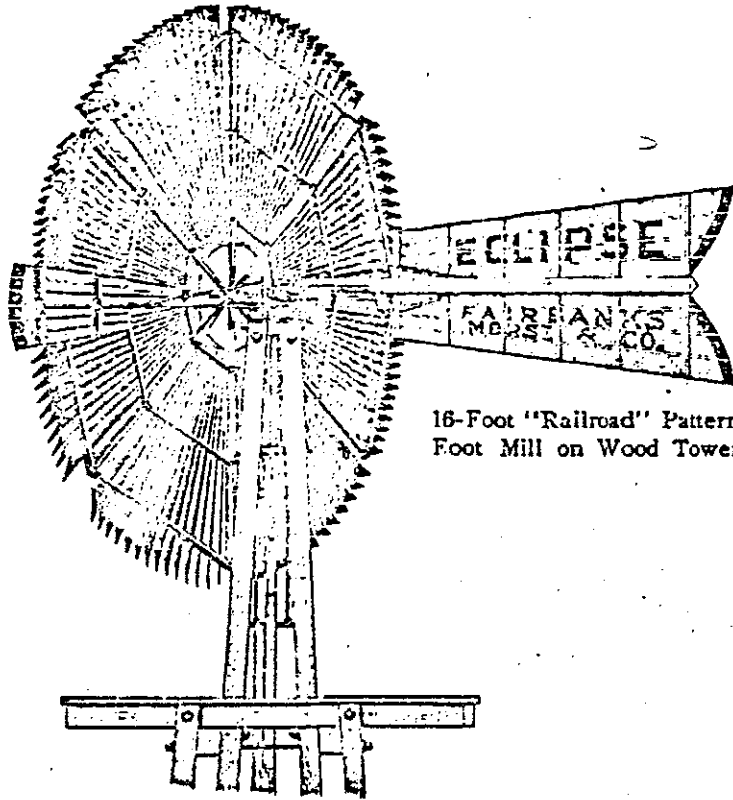
DIRECTIONS FOR ERECTING ON WOOD OR
STEEL TOWERS AND REPAIR PARTS LIST16-Foot "Railroad" Pattern
Foot Mill on Wood Tower

Fig. W6602

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Bakersfield, Cal.
Santa Maria, Cal.
Portland, Oregon

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DIRECTIONS FOR ERECTING ECLIPSE "RAILROAD" AND "TEXAS" PATTERN WINDMILLS

To be Used in Connection with the Accompanying Cut, Pages 4 and 5
Also Print BF46

1st. Put tower cap No. 1 in place on top end of tower posts, and bolt down with four $\frac{1}{2}$ -inch joint bolts, which will be found in the box; then plumb down from the center of tower cap No. 1 to the step block of tower on which mill rests, and place step No. 2 so that the center will come plumb under the center of cap No. 1 and bolt it down, being careful to have the holes in the ends of No. 2 come directly under the corresponding holes in No. 1. Place steel washer No. 99 in step, oiling both step and washer.

Next put in guide rods No. 3, and put on the nuts; then place lower ring No. 4 on top of step No. 2 with the recessed side up, and the slot in each end on guide rods No. 3. Next place center ring No. 5, to which are attached two chains, Nos. 7 and 8, in the recess of the upper side of No. 4, with the long chain No. 7 down, letting chain drop through No. 4; then take upper ring to No. 6 and pass short chain No. 8 up through it and lay it with recessed side down on top of Nos. 4 and 5, and you are ready to hoist the mill.

2d. Hoist main pivot casting No. 9 and drop the stem down through No. 1, thence through Nos. 4, 5 and 6, and let lower end rest in socket in step No. 2. Care must be taken to have step block in tower on which No. 2 rests high enough so the neck of pivot No. 9 will show $\frac{1}{2}$ inch above top of No. 1. Next take off top half of main shaft box No. 11, and put main shaft No. 15 (to which are keyed Nos. 12, 13 and 14) in place, and replace No. 11, and put on the nuts and screw them down tight. The shaft has been properly fitted to box, and pasteboard liners are furnished. These liners should be used. The box should fit tight, but not bind. Next bolt sheave stand No. 16 in place just back of opening in center of pivot No. 9.

In designating the right or left hand side of mill, it is understood that you face the wind, as the mill does when in motion.

3d. Take nut off lower end of king bolt No. 17 and spring tail brace No. 18 off on the right-hand side; slip circle board B on to king bolt No. 17 and bolt it to the under side of tail bar A with bolts which will be found in their places, and put stop braces No. 72 in place, as shown in print BF46; then hoist the tail and let the king bolt No. 17 down through the hole or socket in rear end of pivot No. 9, so that one of the wrought stops which is bolted to circle board B will come each side of the cast stop on No. 9. Then spring tail brace No. 18 back on to the lower end of king bolt No. 17, put on the nut and screw up till tail bar A is level, and no more. It is not designed that the eye of the tail brace No. 18 should come up snug against the lower end of king bolt socket in No. 9.

4th. Fasten side vane pedestal No. 22 on the left-hand side of pivot No. 9 with four set screws, which will be found in their places; then take side vane bar No. 23 to which are attached brace rods Nos. 24, 25 and 26, and castings Nos. 27 and 28, and bolt the fan of the side vane on to the cross at the outer end and casting No. 28, and tighten up the set screw, being careful that the fan is not twisted. Next raise the side vane and insert the end of bar No. 23 in the socket on left-hand side of No. 9, put brace rod No. 25 through the hole in top end of No. 22, and brace rods Nos. 24 and 26 through the holes in the front and rear of pivot No. 9, and screw up the nuts until the brace rods are all tight and side vane bar No. 23 is level; then set bar No. 23 so that the fan on the outer end is perpendicular and tighten up the set screw in the socket which holds it pretty tight. It is now best to bring the tail around parallel with the side vane and tie the two together while erecting the balance of the mill.

5th. Bolt arm C, arm brace D and girt E together (these are sometimes shipped already put together); then bolt arm C into spider No. 13, and arm brace D into brace plate No. 12. (Girt E is not used in mills smaller than 20 feet.) When the arms are all bolted in, put clip castings No. 29 in place, as shown in Print BF46, and put in the inside bolt and put on the nut; then put clip castings No. 30 in their places and drive the bolts in, but leave the nuts off. Next slip sections of fan in from rear of wheel and put in clip castings Nos. 31 and 32, and put in the bolts as you go, but do not screw up the nuts till the wheel is all put together, then care must be taken to have all the nuts screwed up tight. It is good practice to head the bolts over to prevent the nuts coming off.

6th. Put pitman No. 35 in place, remove nut from wrist pin shipped with pitman No. 35, drive wrist pin in the hole giving desired stroke, replace nut, tighten securely. Next place knuckle No. 36S, or No. 79L, on its guide. In the long stroke mills these

are planed ways on the legs inside the pivot No. 9. In the short stroke mill, swing the knuckle No. 36S out to the right-hand side of the mill, and slip guide bar No. 37 through the box on one side of it, and place guide bar in the slotted lugs on the stem of pivot No. 9; be sure the bar is crowded back snug to the bottom of slots and screw up the nuts tight. Replace the caps over slots. The end of guide bar No. 37 which has two nuts on goes up, with one nut above and one below the upper lug; then take the nut off the upper end of piston No. 38 and pass it up through the hole in lower end of pivot No. 9, replace the nut and screw it into knuckle No. 36S and then set the nut up solid against the bottom of knuckle No. 36S; this can be best done with a hammer and cold chisel. It is deemed best by some to put pitman No. 35, knuckle No. 36S, and guide bar No. 37 in their position on the ground and hoist them with pivot No. 9 as before described. In this case it will be best to put in piston No. 38 temporarily, to see that it works freely—which it will do if guide bar is snug back in bottom of slot—and take it out again before hoisting No. 9. Next splice pump pole F and fit swivel box No. 39 on the upper end, then take cap No. 40 off swivel box No. 39 and bolt it on to the neck on lower end of piston No. 38 and then bolt pump pole F in swivel box No. 39. Next get length of pump pole F, which is done by placing the pump and mill both on the center of stroke, and cut it off and bolt it to the pump.

The counterweight No. 63 should be bolted to the wheel arm opposite crank pin. This counterbalances weight of the pump pole, and should be adjusted according to the depth of the well. The deeper the well, and the more pump pole used, the farther out this casting should be placed.

7th. Raise rings Nos. 4, 5 and 6 up on to stem of pivot No. 9, and enter the lugs on ring No. 5, between the sides of pivot stem; then put in pole rods No. 41, the end with single nut on going up; take off the nut and pass the rods up through the inside holes in the end of step No. 2; replace the nuts and screw them well down, then pass the rods up through corresponding holes in ring No. 4, and screw them into ring No. 6 till you get a full thread and then set the nuts up tight under ring No. 4, so as to hold rings Nos. 4 and 6 firmly together, as shown in Print BF46. Next place small sheaves No. 42 in sheave stand No. 16; raise rings Nos. 4, 5 and 6 upon stem of pivot No. 9 close to tower cap No. 1; then pass short chain No. 7 up through pivot No. 9 and over the right sheave into a hook which is fastened on to circle board at that point. Next place large sheave No. 43 on the stud shipped attached to the lower end of pivot stem No. 9; place sheave so the oil hole will be on the outside. Replace stud braces, then pass along chain No. 8 down around sheave No. 43, thence up through rings Nos. 4, 5 and 6 and through pivot No. 9; thence over left-hand sheave No. 42 and around circle board B to left corner, where it is attached by means of a hook with a long thread passing through a plate which is screwed to circle board B at that point; the design of this hook is to take up the slack of the chain, as it may wear from use, and when put up new should go through the plate just far enough for a full nut. If chain No. 8 should be too long, cut off one or more links to make it right; then put shut-off cross head No. 44 on lower end of pull rods No. 41 with nut above and below it, as shown in Print BF46, and screw up tight. Care must be taken to have all the nuts of pull rods No. 41 screwed up very tight, as there is danger of their working loose if they are not. Next splice shut-off pole G and bolt it to cross head No. 44, leaving it long enough to run down through the platform of well or pump pit; when it is raised up and mill is clear out of the wind, this will serve as a guide to the pole at that point.

8th. Proceed to erect shut-off arrangement as shown in Print BF46. Standards J (not furnished with mill or tower) are 3x6, 8 feet long, the lower end of which rests on the platform of well, and the upper end secured to a plank fastened across the tower. The center of reel No. 45 should be six feet above platform; bolt wood arms K into reel No. 45 and put in place, and put on the ratchet; then spike a 2x3 plank across standards J and fasten sheave No. 48 to it with lag screws which are in the box. Place the sheave about the center of reel No. 45 (this piece 2x8, to which sheave No. 48 is fastened, is not shown in cut), pass long reel chain No. 47 (which is always fastened to the end of the reel to which the arms are attached) over sheave No. 48; thence down through platform and attach to hook on top of water box L. The location of water box L can be governed by rod of greater or less length between the hook on box and chain No. 48, as it is sometimes necessary to vary it on account of timbers in the well. Next place weight box No. 50 on shut-off pole G, as shown in Print BF46, so that the bottom of it will be about two inches above platform; then let the mill into the wind so that the shut-off pole G will be clear down and bolt the two smallest lugs, which will be found in the box, on to pole close down on top of weight box No. 50; then bring short reel chain No. 46 down and pass the eye bolt, which is on the end of it, through the hole in lug on the inside

Parts of Large Size Railroad and Texas Pattern Eclipse Windmills.

Do not fail to give

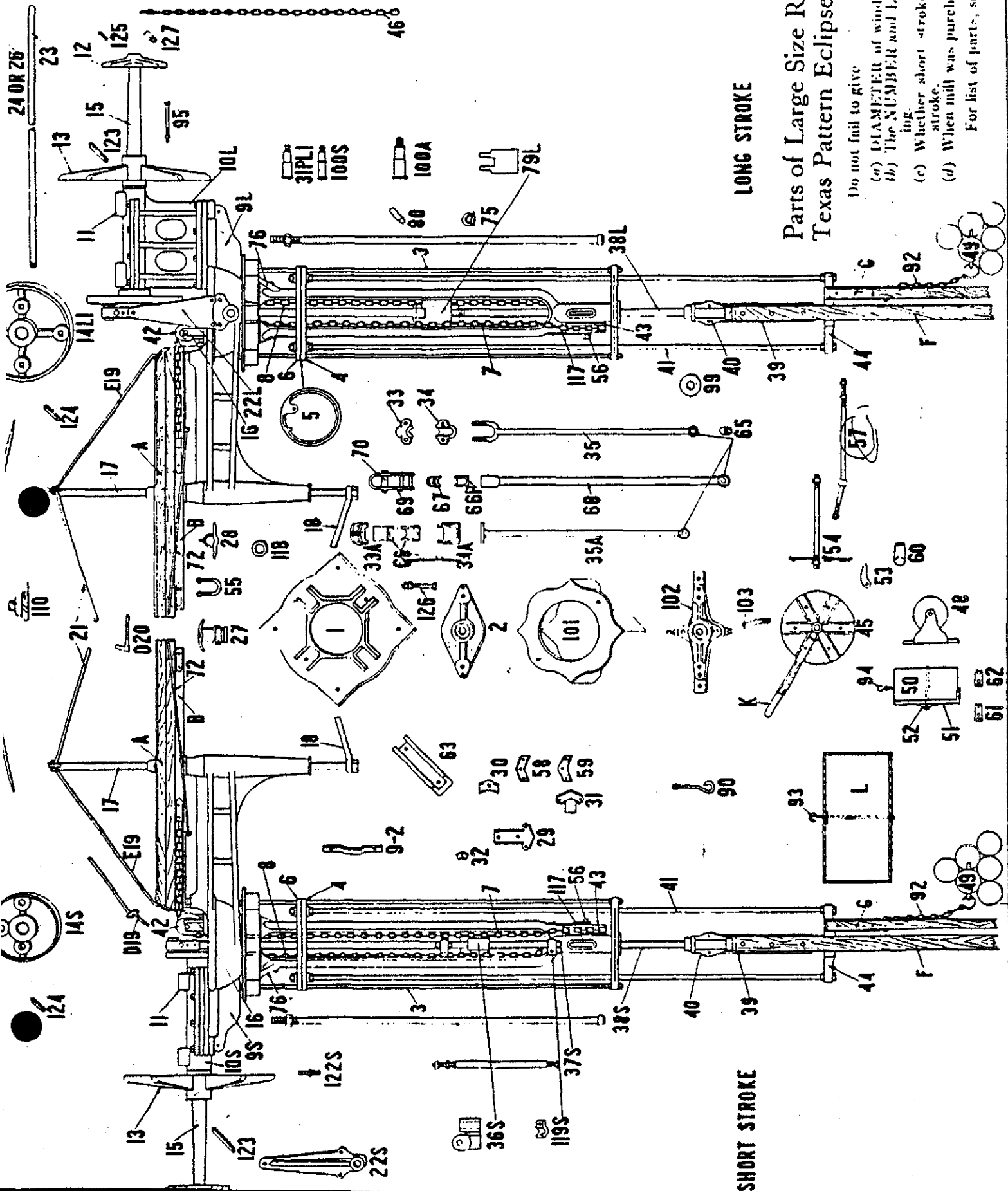
- (a) DIAMETER of wind wheel.
- (b) The NUMBER and LETTERS on casting.
- (c) Whether short stroke pattern or long stroke.
- (d) When mill was purchased.

For list of parts, see pages 7 and 8.

LONG STROKE

SHORT STROKE

ECLIPSE LONG AND SHORT STROKE MILL

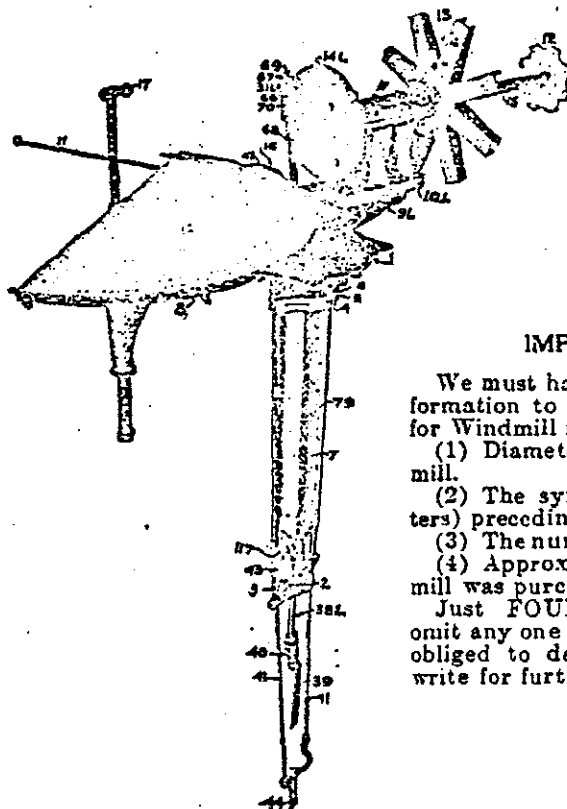


of weight box No. 50 and put on the nut. The chain should be adjusted on reel No. 45 so that, when weight box No. 50 is clear down, the water box L will be at the highest point desired. Guide the poles F and G at points about 10 to 12 feet apart up through the tower.

This arrangement for an automatic shut-off is operated by means of an overflow pipe running from the top of tank and discharging the overflow into water box L, the weight of which, when full, turns reel No. 45 and throws the mill out of the wind. This water, after the overflow from tank ceases, wastes out of water box L through a small hole in the bottom, and lets the mill back into the wind again. When this arrangement is used, the ratchet should be thrown back so as to let the reel play unobstructed, except when it is desired to keep the mill out of the wind for any purpose. If the automatic shut-off is not used, leave off water box L, long chain No. 47, sheave No. 48 and weight box No. 50, putting the eye bolt on short chain No. 46 through the pole G, instead of attaching to weight box No. 50. The design of weight box No. 50 is to balance water box L, and as water box L gets soaked and grows heavier it will be necessary to put sand or some heavy material into weight box No. 50 to counterbalance it.

9th. Place ball box H at some convenient point in the upper part of the tower close to shut-off pole G; then throw the mill clear out of the wind and hang string of balls No. 49 on to shut-off pole G, so that the weight of all the balls will be on the pole, and the lower ball will clear the bottom of box H about two inches.

The self-regulation of the mill is here seen, viz.: The pressure of the wind on the vane, as it increases, tends to carry the wheel around out of the wind to a position parallel with the tail. This tendency is counteracted by the weight of balls No. 49 hanging on the shut-off pole G, which brings the mill back again to its normal position as the wind dies away, thus enabling the mill to take care of itself with a surety in all kinds of weather.



IMPORTANT

We must have the following information to correctly fill orders for Windmill repairs:

- (1) Diameter or size of Windmill.
- (2) The symbol letter (or letters) preceding the number.
- (3) The number on casting, and
- (4) Approximately the date the mill was purchased.

Just FOUR points. If you omit any one of them, we may be obliged to delay the order and write for further information.

Fig. W8603

Working Parts of 20-foot Texas Pattern Eclipse Windmill

REPAIRS FOR "RAILROAD" AND "TEXAS" PATTERN ECLIPSE WINDMILLS

Repair No.	DESCRIPTION	16-Foot Symbol	18-Foot Symbol	20-Foot Symbol	22-Foot Symbol	25-Foot Symbol
1	Tower Collar for Wood.....	D1P	D1P	E1	E1	F1
101	Tower Collar for Steel.....	D101P	D101P	WE1	WE1	F101
2	Pivot Step for Wood.....	D2P	D2P	E2	E2	F2
102	Pivot Step for Steel.....	D102P	D102P	WE2	WE2	F102
3	Guide Rods.....	D3P	D3P	E3	E3	F3
4	Lower Ring.....	D4P	D4P	E4	E4	F4
5	Center Rings.....	D5P	D5P	E5	E5	F5
6	Upper Ring.....	D6P	D6P	E6	E6	F6
7	Long Chain.....	D7P	D7P	E7	E7	F7
8	Short Chain.....	D8P	D8P	E8	E8	F8
98	Pivot Casting (Short Stroke).....	D9P	D9PX	E9	E9	F9
9L	Pivot Casting (Long Stroke).....	D9PLB	D9PLB	E9LA	E9LA	F9-1
9L	Pivot Casting, Upper.....					
9L	Pivot Casting, Lower.....					
108	Lower Half Main Box (S. Stroke).....	D10P	D10P	E10	E10A	F10
10L	Lower Half Main Box (L. Stroke).....	D10PL	D10PL	E10L	E10L	F10
11	Upper Half Main Box (S. Stroke).....	D11P	D11P	E11	E11A	F11
11	Upper Half Main Box (L. Stroke).....	D11PL	D11PL	E11	E11A	F11
12	Brace Plate.....	D12P	D12P	E12	E12	F12
13	Spider.....	D13P	D13P	E13	E13A	F13
148	Loose Plate (S. Stroke).....	D14P	D14P	E14	E14	F14
14L1	Face Plate (L. Stroke).....	D14PL1	D14PL1	E14L1	E14L1	F14A
15	Main Shaft.....	D15P	D15P	E15	E15A	F15
16	Shelve Stand.....	D16P	D16P	E16	E16	F16
17	King Bolts.....	D17P	D17P	E17	E17	F17
18	Tail or Fork Brace.....	D18P	D18P	E18	E18	F18
D19	Tail Casting, Front.....	D19P	D19P			
F19	Nose Brace.....			E19	E19	F19
D20	Tail Casting, Back.....	D20P	D20P			
21	Tail Brace Truss Rods.....	D21P	D21P	E21	E21	F21
228	Side Vane Pedestal (S. Stroke).....	D22P	D22P	E22	E22	F22
22L	Side Vane Pedestal (L. Stroke).....	D22PL	D22PL	E22L	E22L	F22
23	Side Vane Bar.....	D23P	D23X	E23	E23	F23
24	Side Vane Front Brace.....	D24P	D24X	E24	E24	F24
25	Side Vane Top Brace.....	D25P	D25X	E25	E25	F25
26	Side Vane Back Brace.....	D26P	D26X	E26	E26	F26
27	Side Vane Rod Clip.....	D27P	D27P	E27	E27	F27
28	Side Vane Cross Bar Clip.....	A9	A9	B9	B9	B9
9-2	Side Vane Bar Clip.....			B9-2	B9-2	
29	Outside Front Wheel Clip.....	D29P	D29P	E29	E29	F29
30	Inside Front Wheel Clip.....	D30P	D30P	E30	E30	F30
31	Outside Back Wheel Clip.....	D31P	D31P	E31	E31	F31
32	Inside Back Wheel Clip.....	D32P	D32P	E32	E32	F32
31PL1	Wrist Pin (L. Stroke).....	D31PL1	D31PL1	D31PL1	D31PL1	F100A
100A	Wrist Pin.....					
100S	Wrist Pin (S. Stroke).....	F100	E100	E100	F100	
33A	Pitman Wood Box (up Shell).....	E33A	E33A	F33A	E33A	F33A
34A	Pitman Wood Box Shell.....	E34A	E34A	F34A	E34A	F34A
66	Pitman Wood Box (L. Stroke).....	E66A	E66A	F66A	E66A	F66B
66	Pitman Wood Box (S. Stroke).....	E66B	E66B	F66B	E66B	
33A	Pitman.....	D33A	D33A	E33B	F33B	F33A
65	Pitman Lower Bushing.....	D65PA	D65PA	E65B	F65B	F65A
E26	Pitman Rod Bolt.....	E126	E126	E126	E126	E126
66P	Pitman Brass Wedge Box (S. S.).....	D66P	D66P	D66P	D66P	F66A
66P	Pitman Brass Wedge Box (L. S.).....	D66P1	D66P1	D66P1	D66P1	
67	Pitman Brass Upper Box (S. S.).....	D67P	D67P	D67P	D67P	F67A
67	Pitman Brass Upper Box (L. S.).....	D67P1	D67P1	D67P1	D67P1	
68	Pitman (S. S.).....	D68P	D68P	E68	E68	F68A
68	Pitman (L. S.).....	D68P1	D68P1	E68A	F68A	
69	Pitman Strap (S. S.).....	D69P	D69P	D69P	D69P	F69A
69	Pitman Strap (L. S.).....	D69P1	D69P1	D69P1	D69P1	
70	Pitman Wedge and Bolt (S. S.).....	D70P	D70P	D70P	D70P	F70A
70	Pitman Wedge and Bolt (L. S.).....	D70P1	D70P1	D70P1	D70P1	
65	Pitman Lower Bushing (S. S.).....	D65P	D65P	E65A	E65A	F65
65	Pitman Lower Bushing (L. S.).....	D65P	D65P	E65A	E65A	
33	Pitman Babbitt Box (up).....	D33P	D33P	D33P	D33P	F33
34	Pitman Babbitt Box, Lower Half.....	D34P	D34P	D34P	D34P	F34
35	Pitman (Old Style Forked).....	D35P	D35P	E35	E35	F35
65	Pitman Lower Bushing.....	D65P	D65P	E65A	E65A	F65
36S	Pitman Knuckle (S. S.).....	D36P	D36P	E36	E36	
79L	Cross Head (L. S.).....	D79P	D79P	E79	E79	F79
37S	Pitman Guide (S. S.).....	D37P	D37P	E37	E37	
38S	Pitman Rod (S. S.).....	D38P	D38P	F38	E38	

REPAIRS FOR "RAILROAD" AND "TEXAS" PATTERN ECLIPSE WINDMILLS

Repair No.	DESCRIPTION	16-Foot Symbol	18-Foot Symbol	20-Foot Symbol	22½-Foot Symbol	25-Foot Symbol
38L	Piston Rod (L. S.)	D38PL	D38PL	E38L	E38L	F38A
39	Swivel Box	D39P	D39P	E39	E39	F39
40	Swivel Box Cap	D40P	D40P	E40	E40	F40
41	Pull Out Rods	D41P	D41P	E41	E41	F41
42	Small Sheave	D42P	D42P	E42	E42	F42
43	Large Sheave	D43PB	D43PB	E43C	E43C	F43B
44	Out Gear Cross Head	D44P	D44P	E44	E44	F44
45	Out Gear Reel	E45	E45	F45	F45	F45
46	Reel Chains	D46P	D46P	E46	E46	F46
48	Reel Sheave and Stand	E48	E48	E48	E48	D48PA
49	Regulating Balls	E49-1	E49-1	E49-1	E49-1	F48-1
50	Regulating Weight Box	E49	E49	E49	E49	E49
51	Regulating Weight Box Cover	E50	E50	E50	E50	E50
52	Regulating Weight Box Clip	E51	E51	E51	E51	E51
53	Out Gear Reel Pawl	E52	E52	E52	E52	E52
54	Reel Stud	E53	E53	E53	E53	E53
55	U Bolt for Side Vane Rod Clips	E54	E54	E54	E54	E54
56	Stud for Large Sheave	D55P	D55P	E55	E55	E55
57	Fork Brace Stud	D56PA	D56PA	E56A	E56A	F56A
58	Clips for Wheel (Round Holes)			E57	E57	F57
59	Clips for Wheel (Square Holes)			F58	F58	F58
60	Pawl and Latch Support			F59	F59	F59
61	Regulating Stop (Square Holes)	F60	F60	E60	E60	E60
62	Regulating Stop (Round Holes)	E61	E61	F61	F61	E61
63	Counterpoise Weight	E62	E62	F62	F62	E62
64	Cross Braces for Vane, Short	C63	C63	E63	E63	F63
64	Cross Braces for Vane, Long			F64	F64	F64
72	Circle Brace					F61A
73	Piston Collar	D72P	D72P	E72	E72	F72
76	Collar Clip	D73P	D73P	E73	E73	F73A
80	Cross Head Pin	D78P	D78P	E78	E78	
80	Take Up Hook	D80P	D80P	E80	E80	F80
92	Ball Chain	D82P	D82P	E82P	E82P	F80
93	Water Box Hook	D92P	D92P	D92P	D92P	D92P
94	Weight Box Hook	D93P	D93P	D93P	D93P	D93P
95	Joint Bolts	D94P	D94P	D94P	D94P	D94P
99	Step Ring	D95P	D95P	D95P	D95P	F05
103	Step Rod for Steel Tower	D99P	D99P	D99P	D99P	F99
110	Nipple for Vane Brace	D54A	D54A	E154	E154	F154
117	Brace for Sheave Stud			E110	E110	F110
118	Washer for Vane Bearing	D117	D117	E117	E117	F117
118S	Cap for Guide Shaft (S. Stroke)	D118	D118	E118	E118	F118
122S	Main Shaft Box Stud (S. Stroke)	E119	E119	E119	E119	
123	Spider Key	E122	E122	E122	E122	F123
124	Face Plate Key	D123	D123	E123	E123	F123
125	Brace Plate Key	D124	D124	E124	E124	F124
127	Chain Coupling	D125	D125	E125	E125	F125
A	Vane Box	E127	E127	F127	F127	E127
B	Side Vane	D109	D109	F109	F109	F109
F	Circle Board	D106	D106X	E106	E106X	F106
G	Pump Pole	D107	D107	E107	E107	F107
L	Out Gear Pole	D108	D108	E108	E108	F108
	Reel Arms	D114	D114	F114	F114	F114
	Water Box	F115	F115	F115	F115	F115
	Wheel Sections (8)	E112	E112	E112	E112	F112
	Wheel Sections, Outer (8)	D111	D111	E111	E111	F111
	Wheel Sections, Inner (8)	D103	D103X			
	Wheel Arms (8)			E103A	E103X	F103A
	Wheel Arm Braces (8)	D104	D104X	E103	F103AX	F103
	Bumpers (2)	D105	D105X	E104	F104X	F104
	Pump Pole Splice Bands			E105	E105X	F105
	Out Gear Pole Splice Bands	F113	F113	F113	F113	F113
	Splice Bolts for Pump Pole	F131	F131	F131	F131	F131
	Splice Bolts for Out Gear Pole					
	Splice Bolts for Swivel					
	Wheel Bolts					
	Bolts for Step (No. 2)					

B. F. 144. 500 10-17-06

Beloit, Wis., _____ 190_____

20-FOOT ECLIPSE WIND MILL.

LIST OF PARTS PACKED IN BOX.

1 B O.
 1 No. 1 Grease Cup.
 1 Pivot Step No. 2 and Steel Ring.
 1 Each Lower Ring No. 4 and Upper Ring No. 6.
 1 Ceoter Ring No. 5 with Chains No. 7 attached.
 1 Sheave Stand No. 16 and Bolt.
 1 Side Vane Pedestal No. 22.
 8 Wheel Clips each No. 29, 30 and 31.
 16 " " No 32
 8 " " (3-hole).
 2 Small Sheaves No. 42.
 1 Large Sheave No. 43.
 1 Out Gear Cross Head No. 44 and 2 Bolts $2\frac{1}{2} \times \frac{3}{4}$ and 2 Washers.
 1 Out Gear Reel No. 45 with Stud and 2 Nuts and Chains 46 and 47 attached.
 1 Bolt $2\frac{1}{2} \times \frac{3}{4}$.
 1 Pawl, Lug and Bolt, $4\frac{1}{2} \times \frac{3}{4}$.
 1 Sheave No. 48 and 2 Lug Screws $3\frac{1}{2} \times \frac{3}{4}$.
 1 No. 49 attached.

1 Weight Box No. 50 and Hook.
 1 Take-up Honk with Nuts and Washers.
 1 Counterpoise Weight and 2 Bolts $3\frac{1}{2} \times \frac{3}{4}$ and 2 Washers.
 2 Pair Pole Stops and 2 Bolts $3 \times \frac{3}{4}$.
 2 Pair Splice Irons for $2\frac{1}{2}$ Pole.
 2 " " " $1\frac{3}{4}$ " "
 1 Water Box Honk and Nut.
 1 Stud Brace.
 4 Joint Bolts for Collar No. 1.
 2 Tio Oil Box Caps.
 6 Wood Reel Arms and Bolts.
 2 Bolts $5\frac{1}{2} \times \frac{1}{2}$ and 2 Washers for Step No. 2.
 3 " $3\frac{1}{2} \times \frac{1}{2}$ and 3 " " for Swivel No. 30.
 8 " $3\frac{1}{2} \times \frac{1}{2}$ for Pump Pole. F
 8 " $2\frac{1}{2} \times \frac{1}{2}$ for Shut-off Pole. G.
 16 " $5\frac{1}{2} \times 10$ for Wheel Clips.
 8 " $3\frac{1}{2} \times 10$ " " "
 8 " 3×10 " " " and No. 8 Washers.
 24 " $5\frac{1}{2} \times 10$ " " "

Packing List must accompany all reports of errors or shortages and should be mailed to agent you purchased Mill of. When ordering Repairs advise date box was packed.

This Mill when packed for shipment is complete in following pieces:

1 Box of parts as above.
 1 Each Pivot No. 1, lower half box No. 10, and upper half No. 11.
 1 Each Spider No. 13, Shaft 15, Fucc Plate 14, Brace Plate 12 and Wrist Pin keyed together.
 1 Tower Cap No. 1.
 1 Bundle Irons. 1 Each Pitman No. 35, upper half box No. 33, lower half box No. 34, Knuckle No. 36. Piston No. 38, Swivel Box No. 39, Swivel Box Cap No. 40.
 1 Bundle Irons. 1 Each King Bolt No. 17, Vane Brace No. 18 and 2 Bolts $5\frac{1}{2}$ and $6\frac{1}{2}$. Nose Brace No. 19, Circle Brace, Wood Block and Bolt. 2 Each Truss Rods No. 21 and Cross Braces.
 1 Bundle Irons. 1 Each Side Vane Bar No. 23, Side Vane Front, Top and Back Braces No. 24, 25 and 26. Side Vane Rod Clip No. 27, Side Vane Cross Bar Clip No. 28. 2 Each Guide Rods No. 3 and Pull Rods No. 41.

1 Crates 4 Outside Wheel Sections.
 " 8 Inside " "
 " 4 Each Wood Arms, Wood Braces, Wheel Clips No. 31 and 3 Hole Clips.
 " 1 Each Rodder and Side Vanes.

1 Crate Wood Circle Board and 2 Iron Stops.
 1 Wood Rudder Vane Bar A.
 1 Crate Wood Pump Poles F.
 1 " " Out Genr Poles G.

Box Packed by

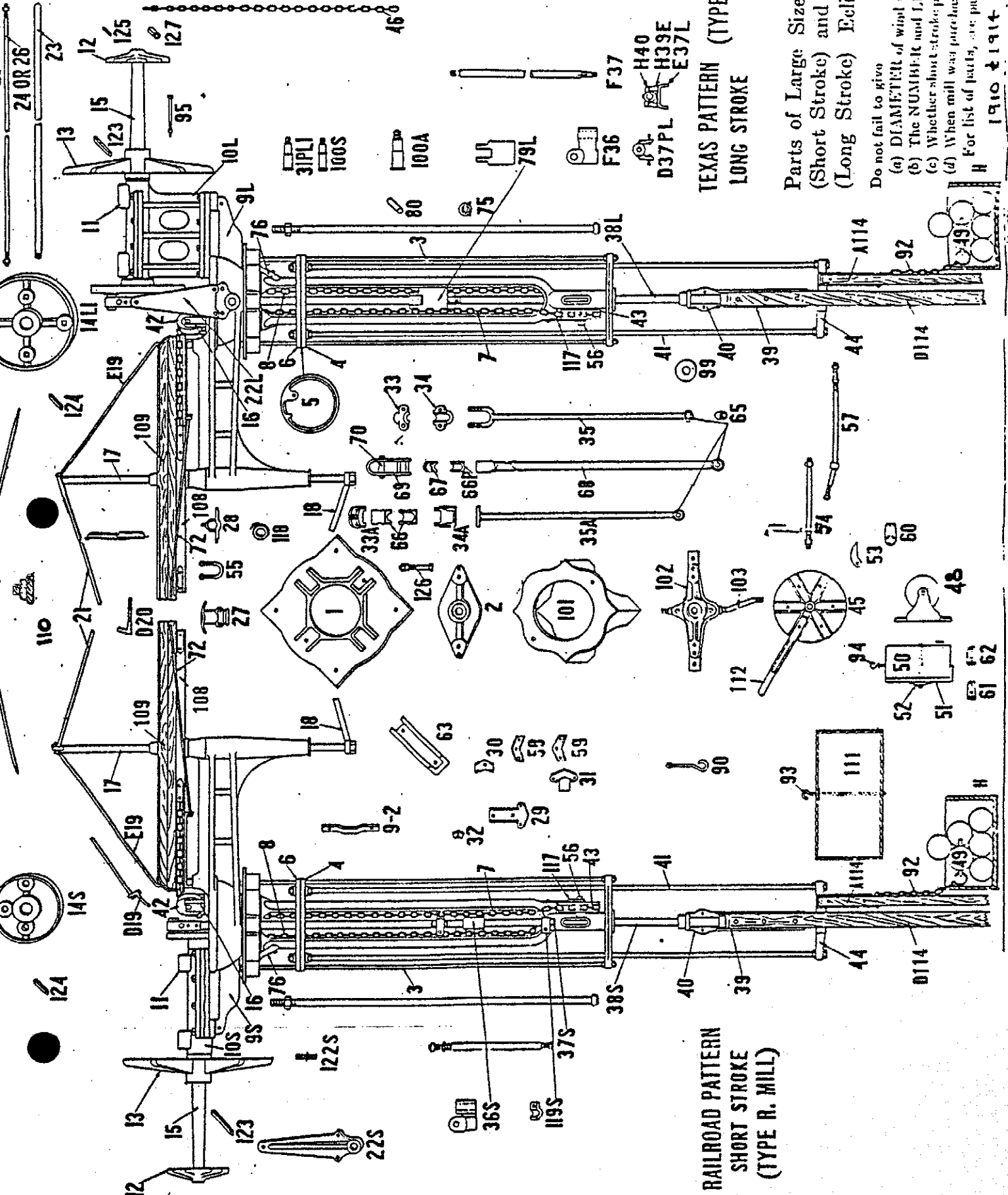
FAIRBANKS, MORSE & CO.

REPAIRS FOR "RAILROAD" AND "TEXAS" PATTERN ECLIPSE WINDMILLS

Repair No.	DESCRIPTION	16-Foot Symbol	18-Foot Symbol	20-Foot Symbol	22-Foot Symbol	24-Foot Symbol
1	Tower Collar for Wood	D1P	D1P	E1	E1	F1
101	Tower Collar for Steel	D101P	D101P	WE1	WE1	F101
2	Pivot Step for Wood	D2P	D2P	E2	E2	F2
102	Pivot Step for Steel	D102P	D102P	WE2	WE2	F102
3	Guide Rods	D3P	D3P	E3	E3	F3
4	Lower Ring	D4P	D4P	E4	E4	F4
5	Center Ring	D5P	D5P	E5	E5	F5
6	Upper Ring	D6P	D6P	E6	E6	F6
7	Long Chain	D7P	D7P	E7	E7	F7
8	Short Chain	D8P	D8P	E8	E8	F8
9S	Pivot Casting (Short Stroke)	D9P	D9PX	E9	E9	F9
9L	Pivot Casting (Long Stroke)	D9PLB	D9PLB	E9LA	E9LA	F9
9L	Pivot Casting, Upper					F9-1
9L	Pivot Casting, Lower					F9-1
10S	Lower Half Main Box (S. Stroke)	D10P	D10P	E10	E10A	F10
10L	Lower Half Main Box (L. Stroke)	D10PL	D10PL	E10L	E10L	F10
11	Upper Half Main Box (S. Stroke)	D11P	D11P	E11	E11A	F11
11	Upper Half Main Box (L. Stroke)	D11PL	D11PL	E11	E11A	F11
12	Brace Plate	D12P	D12P	E12	E12	F12
13	Spider	D13P	D13P	E13	E13A	F13
14S	Face Plate (S. Stroke)	D14P	D14P	E14	E14	F14
14L1	Face Plate (L. Stroke)	D14PL1	D14PL1	E14L1	E14L1	F14A
15	Main Shaft	D15P	D15P	E15	E15A	F15
16	Sheave Stand	D16P	D16P	E16	E16	F16
17	King Bolts	D17P	D17P	E17	E17	F17
18	Tail or Fork Braces	D18P	D18P	E18	E18	F18
D19	Tail Casting, Front	D19P	D19P			
E19	Now Braces			E19	E19	F19
D20	Tail Casting, Back	D20P	D20P			
21	Tail Braces Truss Rods	D21P	D21P	E21	E21	F21
22S	Side Vane Pedestal (S. Stroke)	D22P	D22P	E22	E22	F22
22L	Side Vane Pedestal (L. Stroke)	D22PL	D22PL	E22L	E22L	F22
23	Side Vane Bar	D23P	D23X	E23	E23	F23
24	Side Vane Front Braces	D24P	D24X	E24	E24	F24
25	Side Vane Top Braces	D25P	D25X	E25	E25	F25
26	Side Vane Back Braces	D26P	D26X	E26	E26	F26
27	Side Vane Rod Clip	D27P	D27P	E27	E27	F27
28	Side Vane Cross Bar Clip	A9	A9	B9	B9	B9
9-2	Side Vane Bar Clip	A9-1	A9-1	B9-1	B9-2	
29	Outside Front Wheel Clip	D29P	D29P	E29	E29	F29
30	Inside Front Wheel Clip	D30P	D30P	E30	E30	F30
31	Outside Back Wheel Clip	D31P	D31P	E31	E31	F31
32	Inside Back Wheel Clip	D32P	D32P	E32	E32	F32
31PL1	Wrist Pin (L. Stroke)	D31PL1	D31PL1	D31PL1	D31PL1	F30A
100A	Wrist Pin					F100A
100S	Wrist Pin (S. Stroke)	E100	E100	E100	E100	F100A
33A	Pitman Wood Box Cap Shell	E33A	E33A	E33A	E33A	F33A
34A	Pitman Wood Box Shell	E34A	E34A	E34A	E34A	F34A
66	Pitman Wood Box (L. Stroke)	E66A	E66A	E66A	E66A	F66B
66	Pitman Wood Box (S. Stroke)	E66B	E66B	E66B	E66B	F66A
35A	Pitman (Long or Short Stroke)	D35A	D35A	E35B	E35B	F35A
65	Pitman Lower Bushing, Steel	D65PA	D65PA	E65B	E65B	F65A
126	Pitman Rod Bolt	E126	E126	E126	E126	E126
66P	Pitman Brass Wedge Box (S. S.)	D66P	D66P	D66P	D66P	F66A
66P	Pitman Brass Wedge Box (L. S.)	D66P1	D66P1	D66P1	D66P1	F66A
67	Pitman Brass Upper Box (S. S.)	D67P	D67P	D67P	D67P	F67A
67	Pitman Brass Upper Box (L. S.)	D67P1	D67P1	D67P1	D67P1	F67A
68	Pitman (S. S.)	D68P	D68P	E68	E68	F68A
68	Pitman (L. S.)	D68P1	D68P1	E68A	E68A	F68A
69	Pitman Strap (S. S.)	D69P	D69P	D69P	D69P	F69A
69	Pitman Strap (L. S.)	D69P1	D69P1	D69P1	D69P1	F69A
70	Pitman Wedge and Bolt (S. S.)	D70P	D70P	D70P	D70P	F70A
70	Pitman Wedge and Bolt (L. S.)	D70P1	D70P1	D70P1	D70P1	F70A
65	Pitman Lower Bushing (S. S.) Braces	D65P	D65P	E65A	E65A	F65
65	Pitman Lower Bushing (L. S.) Braces	D65P	D65P	E65A	E65A	F65
33	Pitman Babbitt Box Cap	D33P	D33P	D33P	D33P	F33
34	Pitman Babbitt Box, Lower Half	D34P	D34P	D34P	D34P	F34
35	Pitman (Old Style Forked)	D35P	D35P	E35	E35	F35
36	Pitman Knuckle Pin (S. S.)	D36A	D36A	E36A	E36A	F36
36S	Pitman Knuckle (S. S.)	D36P	D36P	E36	E36	F36
F36	Pitman Knuckle (L. S.) Old Style					F36
37S	Pitman Guide (S. S.)	D37P	D37P	E37	E37	F37
D37PL	Piston Guide (L. S.) Old Style	D37PL	D37PL			
E37L	Piston Guide (L. S.) Old Style			E37L	E37L	
H39E	Piston Guide Box			H39	H39	
H40	Piston Guide Box Cap			H40	H40	
F37	Pitman Guide (L. S.) Old Style					F37
38S	Piston Rod (S. S.)	D38P	D38P	E38	E38	F38A
38L	Piston Rod (L. S.)	D38PL	D38PL	E38L	E38L	F38A
39	Swivel Box	D39P	D39P	E39	E39	F39
39A	Pump Pole Splice Bands	C39	C39	C39	C39	C39

APPENDIX E

Fairbanks Morse Illustration
and Repair Parts List
1910 and 1914



TEXAS PATTERN (TYPE T. MILL)
LONG STROKE

Parts of Large Size Railroad
(Short Stroke) and Texas Pattern
(Long Stroke) Eclipse Windmills

Do not fail to give

(a) DIAMETER of wind wheel.

(b) The NUMBER and LETTERS on castings.

(c) Whether short-stroke pattern or long-stroke.

(d) When mill was purchased.

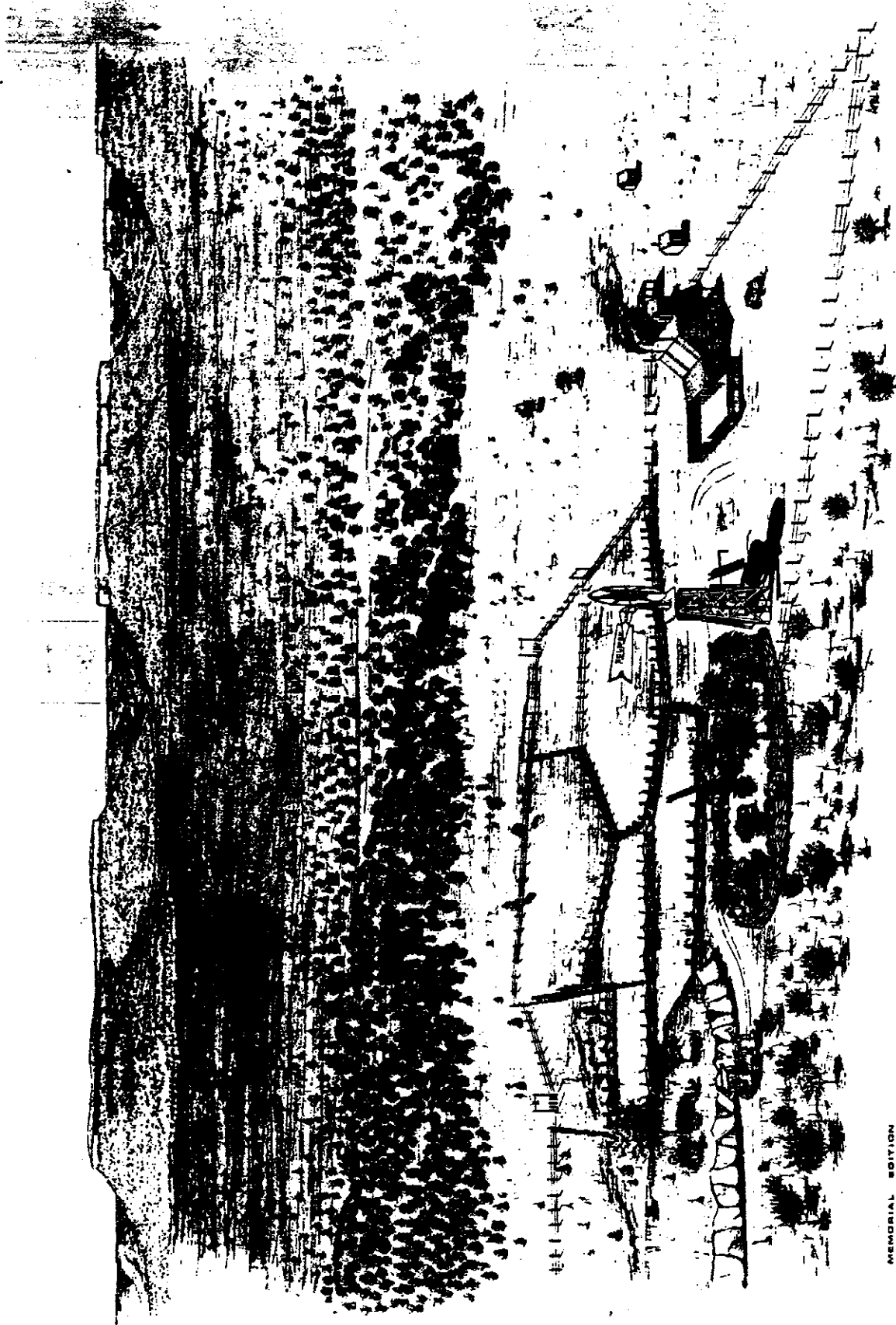
For list of parts, see pages 7 and 8.

1910 & 1914 copy

1910 & 1914

REPAIRS FOR "RAILROAD" AND "TEXAS" PATTERN ECLIPSE WINDMILLS — (Continued)

Repair No.	DESCRIPTION	16-Foot Symbol	18-Foot Symbol	20-Foot Symbol	22½-Foot Symbol	25-Foot Symbol
39A	Out Gear Pole Splice Bands.....	A39	A39	A39	A39	A39
40	Swivel Box Cap	D40P	D40P	E40	E40	F40
41	Pull Out Rods.....	D41P	D41P	E41	E41	F41
42	Small Sheave.....	D42P	D42P	E42	E42	F42
43	Large Sheave.....	D43PB	D43PB	E43C	E43C	F43B
44	Out Gear Cross Head.....	D44P	D44P	E44	E44	F44
45	Out Gear Reel.....	E45	E45	F45	F45	F45
46	Reel Chains.....	D46P	D46P	E46	E46	F46
46	Reel Sheave and Stand.....	E46	E46	E46	E46	F46B
48	Regulating Balls.....	E48-1	E48-1	E48-1	E48-1	F48-1
49	Regulating Weight Box.....	E49	E49	E49	E49	E49
50	Regulating Weight Box Cover.....	E50	E50	E50	E50	E50
51	Regulating Weight Box Clip.....	E51	E51	E51	E51	E51
52	Regulating Weight Box Clip.....	E52	E52	E52	E52	E52
53	Out Gear Reel Pawl.....	E53	E53	E53	E53	E53
54	Reel Stud.....	E54	E54	E54	E54	E54
55	U Bolt for Side Vane Rod Clips.....	D55P	D55P	E55	E55	E55
56	Stud for Large Sheave.....	D56PA	D56PA	E56A	E56A	F56A
57	Fork Brace Stud.....			E57	E57	F57
58	Clips for Wheel (Round Holes).....			F58	F58	F58
59	Clips for Wheel (Square Holes).....			F59	F59	F59
60	Pawl and Latch Support.....	E60	E60	E60	E60	E60
61	Regulating Stop (Square Holes).....	E61	E61	E61	E61	E61
62	Regulating Stop (Round Holes).....	E62	E62	E62	E62	E62
63	Counterpoise Weight.....	C63	C63	E63	E63	E63
64	Cross Braces for Vane, Short.....			F64	F64	F64
64	Cross Braces for Vane, Long.....					F64A
72	Circle Brace.....	D72P	D72P	E72	E72	F72
73	Hook for Circle Board.....	D73P	D73P	E73	E73	F73
74	Circle Board Eye Strap.....	D74P	D74P	E74	E74	F74
75	Plato Collar.....	D75P	D75P	E75	E75	F75A
76	Collar Clip.....	D76P	D76P	E76	E76	
79L	Cross Head (L. S.).....	D79P	D79P	E79	E79	F79
80	Cross Head Pin.....	D80P	D80P	E80	E80	F80
81	Cross Head Wedge.....					F81
90	Take Up Hook.....	D90P	D90P	E90	E90	F90
91	Circle Board Washer.....	D91P	D91P	E91	E91	F91
92	Ball Chain.....	D92P	D92P	D92P	D92P	D92P
93	Water Box Hook.....	D93P	D93P	D93P	D93P	D93P
94	Weight Box Hook.....	D94P	D94P	D94P	D94P	D94P
95	Joint Bolts.....	D95P	D95P	D95P	D95P	F95
97	Circle Board Casting (short).....					F97
98	Circle Board Casting (long).....	D98P	D98P	E98A	E98A	F98
99	Step Ring.....	D99P	D99P	D99P	D99P	F99
103	Step Rod for Steel Tower.....	D54A	D54A	E154	E154	F154
103A	Wheel Sections (8).....	D103	D103X			
103A	Wheel Sections, Outer (8).....			E103A	E103X	F103A
103A	Wheel Sections, Inner (8).....			E103	E103AX	F103
104	Wheel Arms (8).....	D104	D104X	E104	E104X	F104
106	Wheel Arm Braces (8).....	D105	D105X	E105	E105X	F105
106	Vane.....	D106	D106X	E106	E106X	F106
107	Side Vane.....	D107	D107	E107	E107	F107
108	Circle Board.....	D108	D108	E108	E108	F108
109	Vane Bar.....	D109	D109	E109	E109	F109
110	Nipple for Vane Braces.....			E110	E110	E110
111	Water Box.....	D111	D111	E111	E111	F111
112	Reel Arms.....	E112	E112	E112	E112	F112
113	Bumpers (2).....					F113
114	Pump Pole.....	D114	D114	F114	F114	F114
114	Out Gear Pole.....	A114	A114	B114	B114	B114
116	Wheel Arm Studs.....			E116A	E116A	F116
117	Brace for Sheave Stud.....	D117P	D117P	E117	E117	F117
118	Washer for Vane Bearing.....	D118	D118	E118	E118	F118
1198	Cap for Guide Shaft (S. Stroke).....	E119	E119	E119	E119	
1228	Main Shaft Box Stud (S. Stroke).....	E122	E122	E122	E122	
123	Spider Key.....	D123	D123	E123	E123	F123
124	Face Plate Key.....	D124	D124	E124	E124	F124
125	Brace Plate Key.....	D125	D124	E124	E125	F125
127	Chain Coupling.....	E127	E127	E127	E127	E127
129	(Rubber) Bumper.....					F129
311	Circle Board Stop (long).....	D311P	D311P	E311	E311	F311
312	Circle Board Stop (short).....	D312P	D312P	E312	E312	F312
313	Main Shaft Box Stud (long).....					F313
314	Main Shaft Box Stud (short).....					F314
385	Regulating Ball "S" Hooks.....	TA385	TA385	TA385	TA385	TA385
	Splice Bolts for Pump Pole.....					
	Splice Bolts for Out Gear Pole.....					
	Splice Bolts for Swivel.....					
	Wheel Bolts.....					
	Bolts for Step (No. 2).....					



CANON RANCH ECLIPSE WINDMILL CIRCA 1900

MEMORIAL EDITION
CHARLES C. CANON. 1956-1966
E. B. LIGON. 1963-1977

ADDENDUM TO:
CANON RANCH ECLIPSE WINDMILL
Sheffield vicinity
Pecos County
Texas

HAER TX-7
HAER TEX, 186-SHEF.V, 1-

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001